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ON THE RUINS

OF A

STONE PUEBLO

ON THE

ANIMAS RIVER IN NEW MEXICO,

WITH A

GROUND PLAN.

BY

Hon. LEWIS H. MORGAN.

[From the Twelfth Annual Report of the Peabody Museum of Archæology and Ethnology, Cambridge. 1879.]

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ON THE RUINS OF A STONE PUEBLO ON THE ANIMAS RIVER IN NEW MEXICO; WITH A GROUND PLAN.

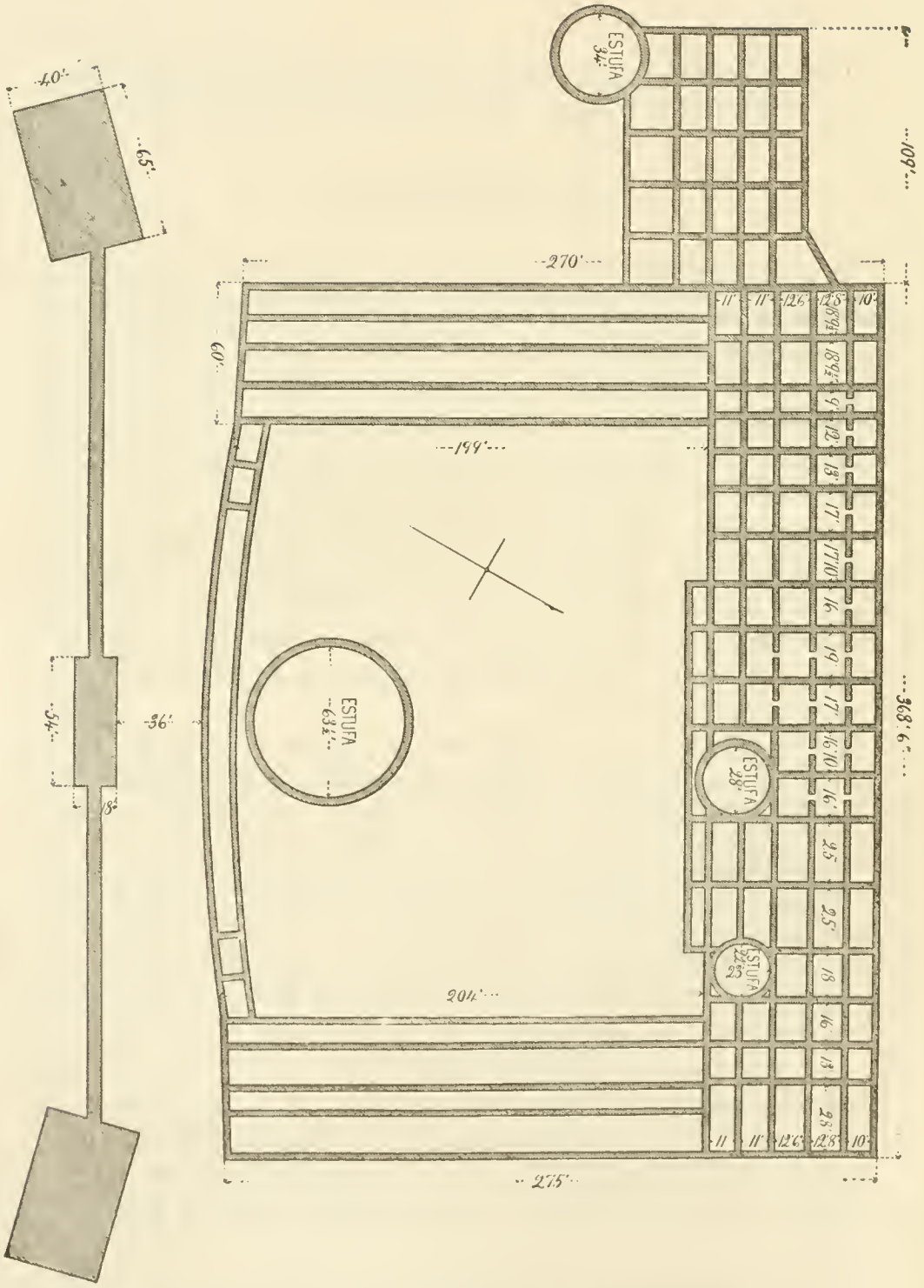
By Hon. Lewis H. Morgan.

The progress made in house architecture by the most advanced Indians of our country is quite remarkable. It is shown by the use of stone, partially dressed, and laid in walls; in the use of a species of mortar having an adhesive bond; and in the construction of houses several hundred feet long, and four and five stories high. The largest of these houses contained 300, 400, and in some few cases. more than 500 apartments, each of which houses would accommodate from 500 to 1000 persons — in fact, a tribe of Indians. They were joint tenement houses of a peculiar style and plan and in the nature of fortresses, designed as places of residence for large numbers of persons intimately related; and to be, at the same time, places of security, capable of defence in case of attack.

The Pueblo House of Stone is the highest constructive work of the Village Indians of North America. These houses differ among themselves in character and design, and in the extent of their accommodations. The best specimens are found in ruins in Yucatan, where, according to Stephens, the stones are dressed on their faces, jointed and laid in courses. We are also assured by the same author that the stones were laid in mortar composed of lime and sand, the correctness of which statement we are disposed to question. In dressing this stone flint implements only were used. The finest of these Yucatan edifices were but one story high, and without fire places or chimneys. They were inferior in the extent of their accommodations to the Pueblo Houses in New Mexico. The largest houses ever constructed by the Village Indians in North America are still found in New Mexico in ruins.

The Pueblo Houses in New Mexico also differ among themselves in the materials used in their construction. Some are of adobe

FIG. 1.



Ground Plan of Ruins on the Animas River, New Mexico.

brick; some are of cobble stone and adobe mortar, or a mixture of stones with natural faces and cobble stones, and the same mortar; while others are of stone on both faces of the walls throughout all the rooms, and the stones laid in adobe mortar. Such was the masonry of the Pueblo about to be desribed, so far as standing walls remain to attest its character.

The Pueblo, of which the Ground Plan is shown (Fig. 1), is one of four situated within the extent of one mile on the west side of the Animas River in New Mexico, about twelve miles above its mouth. Beside these four, there are five other smaller ruins of inferior structure within the same area. This Pueblo was five, or perhaps six stories high, consisting of a main building, three hundred and sixty-eight feet long, and two wings, two hundred and seventy feet long, measured along the external wall on the right and left sides, and one hundred and ninety-nine feet measured along the inside from the end back to the main building. A fourth structure crosses from the end of one wing to the end of the other, thus enclosing an open court. It was of the width of one and perhaps two rows of apartments, and slightly convex outward, which enlarged somewhat the size of the court. The main building and the wings were built in the so-called terraced form; that is to say, the first row of apartments in the main building, and in each wing on the court side, were but one story high. The second row back of these were carried up two stories high, the third row, three stories, and so on to the number of five stories for the main building and four for each wing. The external wall rose forty or fifty feet where the structure was five stories high and but ten feet on the court side, including a low parapet wall where the structure was but one story high. There was no entrance to these great structures in the ground story. After getting admission within the court, they ascended to the roof of the first row of apartments by means of ladders, and in the same way, by ladders, to each successive story. As the second story receded from the first, the third from the second, and so on, each successive story made a great step, ten feet high. The apartments were entered through trap doors in the roof of each story, the descent being by ladders inside. In some places, without doubt, the upper stories were entered by doorways from the roof of the story in front.

The two wings are a mass of ruins. Pit holes along the summit

show the forms of the rooms with plain traces of the original walls here and there; and excavations, made by curious settlers, have opened a number of rooms in the ground story of one of the wings. These we entered and measured. Some of the rooms were faced with stone, i. e. we found a stone wall regularly laid up, as was the case in the main building, as will elsewhere be shown. Some of the walls in these rooms were of cobble stone and adobe; others were of stone with natural faces and cobble stone intermixed. We saw no wall of adobe brick alone. The fallen walls formed a mass about twelve feet deep over the site of the wings, being the deepest on the outside, and thinning out on the court side.

The mass of material used in the construction of these edifices was very great, and surprises the beholder. It is explained in part by the thickness of the walls. We measured a number of them. They were 2 feet 4 inches; 2 feet 6 inches; 2 feet 9 inches; 3 feet, and in rare cases 3 feet 6 inches thick. None measured less than 2 feet.

The main building was originally the best constructed part of the edifice, it may be supposed, because a part of it now remains standing. The walls of the first story, of some part of the second, and, in some places, of a part of the third story, forming the second row of apartments from the outside, are still standing; and rise about twenty-five feet from the ground. The measurements of the second row of apartments, as shown in the diagram, were from the standing walls, and were made in the second story.

The first, or basement story is filled up with the rubbish of the fallen walls, ceilings, and floors, in the second row of apartments named. In some cases they are full above the line of the original ceilings, in others nearly up to them. The main ceiling beams were of yellow cedar from eight to twelve inches in diameter, usually three and four in number, and were placed across the narrow way of the room. Stubs of these beams still remain in the walls parallel with the court. Just above the line of these beams in the other two walls were the ends of a row of poles about four inches in diameter, which passed transversely across the cedar beams. Stubs of these poles, broken off short at the line of the walls, still remain in place. Upon these poles was, originally, thin pieces of split cedar limbs, and then the floor of adobe mortar, four or five inches thick. We thus get the position and

height of the floor of the first and second stories, which were about nine feet six inches for the ground story, and nine feet for the second story.

The external wall of the main building has fallen the entire length of the structure. As these ruins are resorted to by the few settlers in the valley as a stone quarry to obtain stone for foundations to their houses and barns, and for stoning up their wells, the loose material is being gradually removed; and when the standing walls are more convenient to take, they will be removed also. One farmer told me he thought that one quarter of the accessible material of this and the adjacent stone Pueblo had already been removed. It is to be hoped that the number of these settlers inclined to Vandalism will not increase.

A part of the partition walls which connected the outside wall with the next parallel wall is still standing where the wall last named rises above the second story. They stand out for three or four feet like buttresses against the wall, and show the masonry of the parallel and transverse walls was articulated; that the partition walls were continuous from front to rear; and that the walls of the several stories rested upon each other. All this is seen by a bare inspection of the walls as they now stand.

The masonry itself is the chief matter of interest in these structures. Every room in the main building was faced with stone on the four sides, having an adobe floor, and a wooden ceiling. Each room had, as far as walls now remain to show, two doorways through the walls parallel with the court, and four openings about twelve inches square, two on the side of each doorway, near the ceiling. These openings were for light and ventilation. In a limited sense it may be said that the stones were dressed, and also that they were laid in courses; but in the high and strict meaning of these terms, neither is true. The stones used were small and of different sizes. Sometimes they were nearly square, from six to eight inches on a side; sometimes a foot long by six inches wide. The latter is the size of the stones used at Uxmal and Chichen Itza, according to Norman. In some cases longer and thicker stones were used without any attempt to square the ends. In some instances thin pieces of stone were employed with parallel faces. In all cases the stone was a sandstone, now of a reddish brown color. It is the prevailing stone in the bluffs of the Animas River, and of all the

rivers parallel with it running into the San Juan, as far as personal observation enabled me to judge. It is a soft rather than a hard stone, usually of a buff color when first quarried, and some of it has decayed in the using. The wasted and weather-worn appearance of some of these stones would otherwise indicate a very great age for the structure. With stone of the size used a good face can be formed by simple fracture, and a joint sufficiently close may be made by a few strokes with a stone maul. If finer work was aimed at, it must have been accomplished by rubbing the stones to a face. But this work is sufficiently explained by the former processes. In the row of apartments and stories named, both faces of each wall were of stone, so that all of the apartments were of stone on the inside. They were fair walls both in masonry and workmanship, and creditable to the builders. There was an attempt to lay up these walls in courses of uniform thickness, but each course differing from the one above and below it. The attempt was only partially successful. They did not hesitate to break in upon the regularity of the courses. Some of the standing walls are now sprung; but most of them are straight, and fairly vertical, the adobe mortar being sound, and the bond unbroken.

The Indian had a string from time immemorial. With it he could strike a circle, and lay out the four sides of a quadrangular structure with tolerable correctness. It is not too much to assume that with a string and sinker attached, the Village Indian had the plumb line, and could prove his wall as well as we can. At all events, the eye still proves the general correctness of their work.

The adobe mortar of the Pueblo Indians is something more than mud mortar, although far below a mortar of lime and sand Adobe is a kind of finely pulverized clay with a bond of considerable strength by mechanical cohesion. In southern Colorado, in Arizona, and New Mexico, there are immense tracts covered with what is called adobe soil. It varies somewhat in the degree of its excellence. The kind of which they make their pottery has the largest per cent. of alumina, and its presence is indicated by the salt weed which grows in this particular soil. This kind also makes the best adobe mortar. The Indians use it freely in laying their walls, as freely as our masons use lime mortar; and although it never acquires the hardness of cement, it disintegrates slowly. The mortar in these walls is still sound, so that it re-

quires some effort of strength to loosen a stone from the wall, and remove it. But this adobe mortar is adapted only to the dry climate of southern Colorado, Arizona, and New Mexico, where the precipitation is less than five inches per annum. The rains and frosts of a northern climate would speedily destroy it. To the presence of this adobe soil, found in such abundance in the regions named, and to the sandstone of the bluffs, where masses are often found in fragments, we must attribute the great progress made by these Indians in house building.

The exclusive presence of this adobe mortar in all New Mexican structures of the aboriginal period shows that the tribes of New Mexico were then ignorant of a mortar of lime and sand. And here a digression may be allowed to consider whether a cement of this grade was known to the aborigines. Theoretically, the use of a mortar composed of quick lime and sand, which gives a cement chemically united, would not be expected of the Indian tribes either in North or South America. There is no sufficient proof that they ever produced a cement of this high grade. It requires a kiln, artificially constructed, and a concentrated heat to burn limestone into lime, supposing they had learned that lime could be thus obtained, and some knowledge of the properies of quick lime before they reached the idea of a true cement. The Spanish writers generally speak of walls of lime and stone, thus implying a mortar of lime and sand. Thus Bernal Diaz speaks of the great temple in the Pueblo of Mexico as surrounded "with double enclosures built of stone and lime."[1] Clavigero remarks that "the houses of lords and people of circumstances were built of stone and lime."[2] Again, "the ignorant Mr. De Pau denies that the Mexicans had either the knowledge, or made use of lime; but it is evident from the testimony of all the historians of Mexico, by tribute rolls, and above all, from the ancient buildings still remaining, that all these nations made the same use of lime as all the Europeans do."[3] In like manner, Herrera, speaking of Zempoala, near Vera Cruz, remarks that the Spaniards, entering the town, found "the houses [were] built of lime and stone,"[4] and again speaking of houses in Yucatan, he remarks that "at the

[1] The true history of the Conquest of Mexico, Keatinge's Translation, Salem, Ed. 1803, Vol. I, p. 208.

[2] History of Mexico, Cullen's Trans. Phila. Ed. 1817, Vol. II, p. 232.

[3] Ib. Vol. II, p. 237.

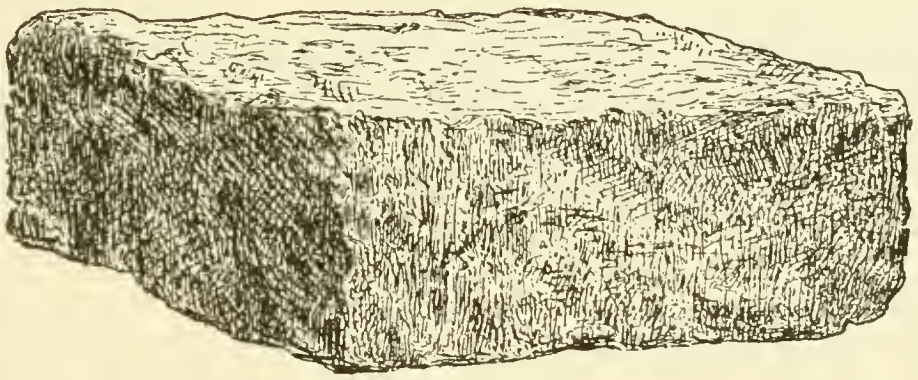
[4] History of America, Stevens' Trans. Lond. Ed. 1725, Vol. II, p. 266.

place where the encounter happened, there were three houses built of lime and stone."[5] These several statements can hardly be said to prove the fact. Mr. John L. Stephens, in speaking of the ruins at Palenque, is more explicit. "The building was constructed of stone, with a mortar of lime and sand, and the whole front was covered with stucco, and painted."[6] The back wall of the Governor's house at Uxmal, is 9 feet thick through its length of 270 feet. In this wall, by means of crowbars, "the Indians made a hole 6 and 7 feet deep, but throughout the wall was solid, and consisted of large stones imbedded in mortar, almost as hard as rock."[7] At the ruins of Zayi, there was one row of ten apartments, 220 feet long, called the Casas Cerrada, or closed house, because the core over which the triangular ceiling was constructed had not been removed when the house was abandoned, of which Stephens says, "we found ourselves in apartments finished with the walls and ceilings like the others, but filled up (except so far as they had been emptied by the Indians,) with solid masses of mortar and stones."[8] Norman speaking of the ruins of the House of the Cacique at Chichen, remarks, "that the wall is made of large and uniformly square blocks of limestone, set in mortar, which appears to be as durable as the stone itself."[9] Elsewhere, speaking of the ruins of Yucatan generally, he observes, "the stones are cut in *parallelopipeds* of about 12 inches in length and 6 in breadth, the interstices filled up of the same materials of which the terraces are composed."[10] That these tribes used mortar of some kind in their stone walls cannot be doubted, but these several statements do not prove the use of quick lime, which is the main question. Mr. Stephens' statement satisfied me until I saw the New Mexican Pueblos. These show that a very efficient mortar can be had without the use of lime. The Indians of Mexico and the coast tribes near Vera Cruz plastered their houses externally with gypsum which made them a brilliant white, and the stucco used upon the inner walls of houses in Chiapas and Yucatan was not unlikely made of gypsum. This mineral is abundant as well as easily treated. From it comes plaster of Paris, and from it may have come in some form the bond which held the mortar together, to the strength of which Mr. Stephens refers.

[5] Ib. Vol. II, p. 112. [6] Central America, Chiapas and Yucatan, Vol. II, p. 310.
[7] Ib. Vol. I, p. 178. [8] Ib. Vol. II, p. 23. [9] Rambles in Yucatan, p. 120. [10] Ib. page 127.

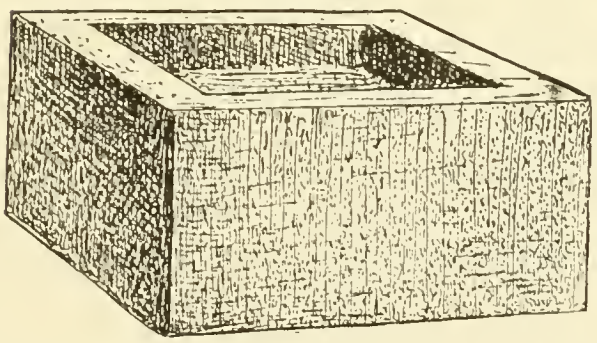
The neatness and general correctness of the masonry is now best seen in the doorways. In the standing walls of the second story, and of the first, where occasionally uncovered, there are to be seen two doorways in each room as before stated, running in all cases across the building from the court side toward the external wall, and never in the direction of its length. These doorways measured some 3 feet 2 inches in height by 2 feet 6 inches in width, and others 3 feet 4 inches by 2 feet 7 inches.

FIG. 2.



Stone from Doorway.

FIG. 2. *a*.



A finished block of sandstone for comparison with Fig. 2.

The stone used in these doorways are rather smaller than those in other parts of the wall, but prepared in the same manner.

I brought away two of these stones, taken from the standing walls of the main building, as samples of the character of the work with respect to size and dressing. Fig. 2 represents one of them, engraved from a photograph. It measures 8 inches in its greatest length by 6 inches in its greatest width, and it is $2\frac{3}{4}$ inches in thickness. The upper and lower faces of the stone are substantially, but not exactly, parallel. It also shows one angle, which

is substantially, but not exactly, a right angle; and it was so adjusted that the long edge was on the doorway, and short one in the wall of a chamber or apartment, with the right angle at the corner between them. This stone was evidently prepared by fracture, probably with a stone maul, and the regularity of the breakage was doubtless partly due to skill and partly to accident. It shows no marks of the chisel or the drove, or of having been rubbed, and where the square is applied to the sides or angles, the rudeness of the stone is perfectly apparent.

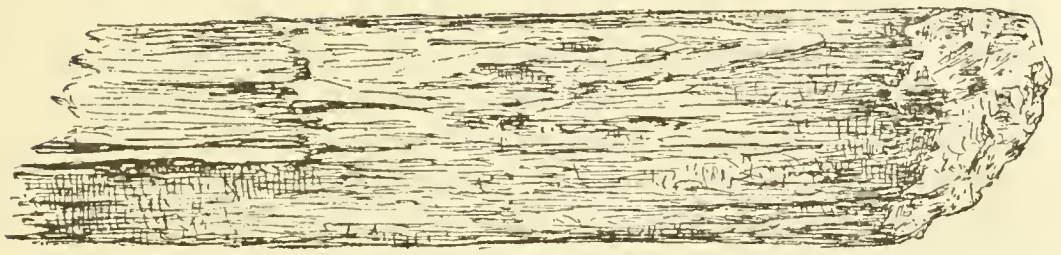
Fig. 2 *a*, represents a sandstone cut by American skilled workmen in the form of a brick, and it is intended to show by comparison the great difference between the dressed stone of the civilized man and the ruder stone of the mason in the condition of barbarism. The comparison shows that no instruments of exactness were used in the stone work of the Pueblo, and that exactness was not attempted. But the accuracy of a practical eye and hand, such as their methods afforded, was reached, and this was all they attempted. With stones as rude as that shown in the figure, a fair and even respectable stone wall may be laid. The art of architecture in stone is of slow and difficult growth. Stone prepared by fracture with a stone hammer, precedes dressed stone, which requires metallic implements. In like manner mud mortar or adobe mortar precedes a mortar of lime and sand. The Village Indians of America were working their way experimentally, and step by step, in the art of house building, as all mankind have been obliged to do, each race for itself; and the structures the Village Indians have raised in various parts of America, imperfect as they are by contrast, are highly creditable to their intelligence.

Stone lintels were not used for these doorways, as stones 3 feet long would have been required. No stones of half that length are to be seen in any of the walls. They had, however, the idea of a stone lintel, for they used them in this structure over the foot square openings for light and air. We found a stone lintel over an opening 18 inches wide in a Cliff House on the Mancos River. This was so firmly imbedded that we found its removal impossible. They used for a lintel six round cedar cross pieces (Fig. 3), each about 4 inches in diameter, and now perfectly sound.

In some of these doorways we noticed a peculiar feature. On the side toward the external wall, one and sometimes two of these

wooden lintels were placed, 4 and sometimes 6 inches lower than the remainder, so that on entering from the outside room into the second room, the top of the doorway rose higher as the room was entered. A necessity was experienced to save the head from bumps, and the wonder is that it did not occur to them to raise the doorways to the height of the body. As the doorways were always open, no doors being used, it may well be that larger

FIG. 3.



Section of Cedar Lintel.

openings would have created stronger currents of air through the building than they wished. The ends of these lintels were hacked off by stone implements of some kind.

The peculiar arrangement of the doorways tends to show that this great house was divided into sections by the partition walls extending from the court to the exterior wall; and that the rooms above were connected with those below by means of trap doors and ladders. If this supposition be well founded, the five rooms on the ground floor, from the court back, communicated with each each other by doorways. The four in the second story communicated with each other in the same manner, and with those below through trap doors in the floors. The three rooms in the third story communicated with each other by doorways, and with those below as before. The same would be true of the two rooms of the fourth story. It seem probable that the connected rooms were occupied by a group of related families.

We afterwards found the same thing, nearly, exemplified in the present occupied Pueblo of Taos in New Mexico. Here there are two large edifices of adobe brick, five and six stories high respectively, and about two hundred yards apart. We found that the families lived in the second and upper stories, and used the rooms below them for storage and for granaries. Each family had 2, 4, and 6 rooms, and those who held the upper rooms held

those below. The whole number of Indians now living in the two houses is about four hundred.

In the south wing before mentioned, several rooms on the ground floor are still perfect, with the ceilings in place upholding the rubbish above. The openings or trap doorways of two of these rooms are still perfect, but the ladders are gone. The rooms had been opened, as elsewhere stated, by late explorers. One of these trap doors measured 16 by 17 inches, and the other 16 inches square. Each was formed in the floor by pieces of wood put together. The work was neatly done. These rooms were smaller than the rooms above. Some were as narrow as 4 feet 6 inches, others 6 feet, showing that one room had been divided into two. These basement rooms were probably occupied for storage exclusively, whence their division. They were dark, except as light entered through the trap door way from above.

The structure connecting the wings and bounding the court was evidently a single or double row of apartments. This is shown by the amount of fallen material which is larger than a wall would require, and from pits or depressions which plainly marked the outline of apartments.

There are two circular Estufas in the main building, one 23 feet and the other 28 feet in diameter. A part of the wall of the first Estufa is still standing. It is of stone, mostly of blocks about 5 inches square, and laid in courses, with considerable regularity. The work is equal to the best masonry in the edifice. In the open court, and near the outer structure, bounding it in front, is another Estufa of great size 63½ feet in diameter. These Estufas, which are used as places of council, and for the performance of their religious rites, are still found at all the present occupied Pueblos in New Mexico. There are 6 at Taos, 3 at each house, and they are partly sunk in the ground by an excavation. They are entered through a trap doorway in the roof, the descent being by a ladder.

Outside the front wall closing the court, and about 30 feet distance therefrom, are the remains of a low wall crossing the entire front and extending beyond it. The end structures were about 65 feet long by 40 feet wide, while at the centre was a smaller structure, 54 feet long by 18 wide. All its parts were connected. It was evidently erected for defensive purposes; but it is impossible to make out its character from the remains.

One wing is several feet longer than the other, and the wall on

the court side is about 20 feet longer than the opposite exterior wall, thus showing that they used no exact measurements.

There were no fireplaces with chimneys in this structure. There are none in the ruins in Yucatan and Central America. It is a fair inference, therefore, that chimneys were entirely unknown to the aborigines at the time of their discovery. They have since that time been adopted into the old Pueblo houses from American or Spanish sources. They are placed in one corner of the room. We saw recently at Taos two chimneys and two fireplaces in one and the same room, one for cooking, and the other for a fire to warm the room; proof conclusive that they were not to the chimney born. They were in an apartment of one of the principal chiefs.

In a number of rooms are recesses like niches left in the wall, about 2 feet 6 inches wide and high, and about 18 inches deep. These furnished places to set household articles in, in the place of a mantel, or shelf. We afterwards saw niches precisely similar at Taos, and thus used.

It remains to consider the number of rooms or apartments contained in this great edifice. It is plain that it was built in the terraced form, the second story set back from the first, the third from the second, and so on to the last which was a single row of apartments, on the top somewhere, but not necessarily on the back side. Pueblos were not entirely uniform in this respect. The edifice at Taos recedes in front and rear and even upon the sides. This may have been built in the same way, but it can neither be proved or disproved from the ruins. The number of apartments would not vary much whether the upper stories were symmetrically formed or irregularly. If symmetrical, the main building contained 260 apartments, and each wing 70, making the computation for the latter by area, and from the number of depressions still discernible thus making an aggregate of 400 rooms.

The house was a fortress, proving the insecurity in which the people lived. It was also a joint tenement house of the aboriginal American model, indicating a plan of life not well understood. It may indicate an ancient communism in living, practised by large households formed on the principle of kin. In such a case the communism was limited to the household as a part of a kinship.

Those familiar with the remains of Indian Pueblos in ruins will

recognize at once the resemblance between this Pueblo, and the Stone Pueblos in ruins on the Rio Chaco in New Mexico, about thirty miles distant from these ruins, particularly the one called Hungo Pavia so fully described by Gen. J. H. Simpson. There is one particular in which the masonry agrees, viz., in the use of courses of thin stones, about half an inch in thickness (Fig. 4),

FIG. 4.

Thin stone from wall.

sometimes three together, and sometimes five and six. These courses are carried along the wall from one side to the other, but often broken in upon. The effect is quite pretty. The stone represented in the figure, measures 6 inches in length by $\frac{1}{2}$ an inch in thickness. Gen. Simpson found the same courses of thin stones, and even thinner, and comments upon the pleasing effect they produced.

This edifice was a credit to the skill and industry of the men among the Village Indians; for the men, and not the women, were the architects and the masons, although the women undoubtedly assisted in doing the work. Women brought stone and adobe and cedar, and made adobe mortar, without a doubt, as they still do. One of the hopeful features in their advancement was the beginning of the reversal of the old usage which put all labor upon the women. It is now the rule among the Village Indians for the men to assume the heavy work, which was doubtless the case when this Pueblo was constructed. They cultivated maize, beans, and squashes, in garden beds, and irrigated them with water drawn from the river by means of a canal, and passed in several smaller streams through their gardens. The men now engage in the work of cultivation. This is a sure sign of progress.

Off the south wing of the building, and without it, are the remains of an additional building, large enough for twenty or thirty rooms on the ground, some part of which were, doubtless, carried up two or more stories high; But it is a mass of indistinct ruins about which little can be said, except that some of the rooms were ususually large. This may have been the first building constructed, and the one occupied while the Stone Pueblo was

being constructed. Near this Pueblo, about 500 feet distant, was another stone Pueblo of nearly equal size. Some of its walls are still standing, and a number of its rooms are still perfect. At the distance of a mile, and on the bank of the Animas River, was a third, and equally large Pueblo, which is a mass of ruins, Not a wall is standing above the mass. Between this, and the Pueblo first described, and near the river, are the ruins of a fourth Pueblo, smaller in size.

The valley of the Animas River is here broad and beautiful, about three miles wide. The river passes through the centre of the valley. The cliff, on the east side of the level plain, is bold and mountainous, rising from 1500 to 2000 feet high; while on the west side, the valley is bordered with the mesa formation in two benches, one rising back of the other, and both as level as a floor, with the highlands forming the divide between the Animas and La Plata Rivers in the distance.

From the number and size of the houses, there was probably a population of at least 5000 persons at this settlement, living by horticulture. It is not now known by what tribe of Indians these Pueblos were inhabited or constructed.

These Pueblos, newly constructed, and in their best condition, must have presented a commanding appearance. From the materials used in their construction, from their palatial size and unique design, and from the cultivated gardens by which they were doubtless surrounded, they were calculated to impress the beholder very favorably with the degree of culture to which the people had attained. It is a singular fact that none of the occupied Pueblos in New Mexico at the present time are equal in materials or in construction with those found in ruins. It tends to show a decadence of art among them since the period of European discovery.

As a conclusion to this article, I wish to call attention to the San Juan district, to its numerous ruins, and to its importance as an early seat of Village Indian life. These ruins and those of a similar character in the valley of the Chaco about sixty miles distant therefrom, together with numerous remains of structures of cobble stone and adobe in the San Juan valley, in the Pine River valley, in the La Plata valley, in the Animas River valley, and westerly in the Montezuma valley, among the latter of which are

the ruins of several large pueblos of stone,[11] suggest the probability that the remarkable area within the drainage of the San Juan River and its tributaries has held a prominent place in the first and most ancient development of Village Indian life in America. The evidence of Indian occupation and cultivation throughout the greater part of this area is sufficient to suggest the hypothesis that the Indian here first attained to the condition of the Middle Status of Barbarism; and sent forth the migrating bands who carried this advanced culture to the Mississippi valley, to Mexico and Central America, and not unlikely to South America as well.

Indian migrations are gradual outflows from an overstocked area, followed by organization into independent tribes, and continuing through centuries of time, until the ethnic life of each tribe is expended, or a successful establishment is finally gained in a new and perhaps far distant land. They planted gardens and constructed houses as they advanced from district to district, and removed as circumstances prompted a change of location.

Since the cultivation of maize and plants precedes, or is synchronous with this stage of development, it leads to the supposition that maize must have been indigenous in this region, and that it was here first brought under cultivation. There are some facts that seem to favor this hypothesis.[12] At present I wish to

[11] One of these near the base of the Ute Mountain, north east side, and in the Montezuma valley so-called, which I visited in 1878, was situated upon a ledge of rock 20 feet high, and in two sections interrupted by a break in the rock about 20 feet wide used as a reservoir of water. The principal building was 510 feet long, and measured through at the north end 110 feet, 90 feet near the middle, and 18 feet at the south end. The other section was 110 feet in front, and 80 feet wide. Both were of stone, some of the walls of which are still standing. The main building contained a round tower, above 40 feet in diameter, and at least two stories high.

[12] Where maize was indigenous is unknown, except that it was somewhere upon the American continent. It is the only cereal America has given to the world. At the period of European discovery, it was found cultivated and a staple article of food in a large part of North America and in parts of South America. There were also found beans, squashes and tobacco, with the addition in some areas of peppers, tomatoes, cocoa and cotton. The problem of the place of the origin of maize is probably insoluble, but speculations are legitimate, and such are all that I have to offer.

The fecundity of plant life in the Rocky Mountains is remarkable, particularly on the southern slopes, where they subside into the mesa, or table land formation, north of the San Juan river. The Continental divide is in the eastern margin of this region. The first suggestion I wish to make is that all the cereals and cultivated plants must have originated in the great continental mountains of the two hemispheres, and have propagated themselves along the water courses of the mountain valleys down to the plains traversed by the great rivers formed by these mountain tributaries. All the cereals belong to the family of the Grasses (Graminæ), and each of them, doubtless, is the last of a series of antecedent forms.

I saw rye, barley, and oats growing wild by self-propagation in the mountain valleys

call attention such existing evidence as points to the San Juan district as the anterior home of a number of historic Indian tribes.

1. *The Mound Builders.* Although these tribes had disappeared at the epoch of European discovery, and cannot be classed with any known Indian stock; their condition as horticultural tribes, their knowledge of some of the native metals, and the high character of their stone implements and pottery place them in the class of Village Indians. The nearest region from which they could have been derived is New Mexico. There is no reason for referring them to the San Juan region more than to the nearer country of the Rio Grande, unless it should appear probable that the inhabitants of the latter valley were themselves migrants from the same region. But there are good reasons for deriving the

of Colorado the present season; also the wild pea, whose stunted seeds had the taste of the cultivated pea. Turnips, onions, tomatoes and hops are found growing wild in the Pine river valley; and the pie plant or rhubarb is said to grow luxuriantly in the Elk mountain valleys. I also saw wild flax and the gourd growing by self-propagation in the valley of the Animas. Currants, gooseberries, raspberries, and strawberries are found in the mountain valleys in numerous places, together with flowering plants of many species and varieties. Tiny forms of flowering plants are to be seen above patches of snow in places where the snow had recently melted. This fecundity of plant life from 10 to 12,000 feet above sea level, and the relation of these mountain tributaries to the San Juan, which runs from east to west, not remotely from the base of these mountains, in such a manner as to unite and receive into its lap, so to express it, the vegetable wealth developed in these mountain chains, are facts that force themselves upon the attention of the observer.

The altitude of the San Juan valley ranges from 7,095 ft. at Pagosa Springs to 5,970 ft. at the mouth of the Animas, and diminishing to 4,416 feet near the point where it empties into the Colorado (Hayden's Atlas of Colorado, Sheet III). The altitude at Conejos is 7,880 feet (Ib., Sheet III), which is about as great an elevation as admits of the successful cultivation of maize. I noticed in a field of maize growing at Conejos, that the stock grew only about three feet high, and the fact that the ear grew out of it but six inches from the ground. Specimens of the ear we obtained showed that it was about five inches long, with the kernel small and flinty. The ear is in four colors, white, red, yellow, and black, each being one or the other of these colors. In a few cases, two colors were intermixed in the same ear. It seemed probable that this was the primitive maize of the American aborigines, from which all other varieties have been developed. A few cobs we found at a Cliff House on the Mancos river corresponded with the Conejos ear in size, and was probably the same variety. Afterwards at Taos I found the same ear in white, red, yellow and black; the staple maize now cultivated at this pueblo, but much larger in size. I brought away several fine ears saved for seed. One black ear measured twelve inches in length, with twelve rows of kernels, while the white variety, both at Conejos and Taos, had each fourteen rows.

Finally, a dry country, neither excessively hot nor moist, like the San Juan region, would seem to be most favorable for the development and self-propagation of maize as well as plants until man appeared for their domestication. These are but speculations, but if they should prompt further investigations concerning the place of nativity of this wonderful cereal, which has been such an important factor in the advancement of the Indian family, and which is also destined to prove such a support to our own, these suggestions will not have been made in vain.

mound builders from the Village Indians in some part of New Mexico.

11. *The Mexican Tribes.* The seven principal tribes of Mexico, called collectively the Nahuatlacs, spoke dialects of the same language, and all alike had a tradition that their ancestors came from the North, and that the separate tribes came into Mexico at long intervals apart. They arrived in the following order as to time: 1, Sochomilcos; 2, Chalcas; 3, Tepanecans: 4, Tescucans; 5, Tlathuicans; 6, Tlascalans; 7, Aztecs or Mexicans. They settled in different parts of Mexico. The Cholulans, Tepeacas, and Huexatsincos, spoke dialects of the Nahuatlac language, and were severally subdivisions of one or the other preceding tribes. They had the same tradition of a northern origin. These several tribes were among the most prominent in Mexico at the period of Spanish discovery. Some of the tribes of Yucatan and Central America also had similar traditions of an original migration of their ancestors from the North.

Acosta, who visited Mexico in 1585, and whose work was published at Seville in 1589, states the order of the migration of the Mexican tribes as above given, and further says that they "come from other far countries which lie toward the North, where now they have discovered a kingdom they call New Mexico. There are two provinces in this country, the one called *Aztlan*, which is to say, a place of Herons [Cranes], and the other Teculhuacan, which signifies a land of such whose grandfathers were divine. The Navatalcas [Nahuatlacs] point their beginning and first territory in the figure of a cave, and say they came forth of seven caves to come and people the land of Mexico."[13] The same tradition, substantially is given by Herrara,[14] and also by Clavigero.[15] If by the word Aztlan was intended "place of Cranes;" and on the supposition that these tribes migrated from the San Juan region, the reasons for the designation are justified. The Sandhill Crane (Grus Canadensis) is one of the largest and most conspicuous of American birds, and is still found from the British Possessions to New Mexico, and winters in the latter. I saw a pair of these great birds the present season in the valley of the

[13] The Natural and Moral History of the East and West Indies, London Ed. 1604. Grimstones Trans. pp. 497, 504.

[14] General History of America, London Ed. 1725. Steven's Trans. III, 188.

[15] History of Mexico. Cullen's Trans. I, 119.

Animas River. Mr. Coues remarks, that "thousands of Sandhill Cranes repair each year to the Colorado River valley, flock succeeding flock along the course of the great stream from their arrival in September until their departure the following spring. Taller than the Wood Ibises or the largest Herons with which they are associated the stately birds stand in the fore-ground of the scenery of the valley. * * * Such ponderous bodies moving with slowly beating wings give a great idea of momentum from mere weight, a force of motion without swiftness; for they plod along heavily, seeming to need every inch of their ample wings to sustain themselves."[16] It is an Indian trait to mark localities by some conspicuous feature or fact, and the selection of the Sandhill Crane to indicate their home country would have accorded with Indian usages.

Again, Herrara, who presents the current traditions, observes, that "these peoples painted their original in the manner of a cave, and said they came out of seven caves to people the country of Mexico. * * * After the six above mentioned races departed from their country, and settled in New Spain, where they were much increased, the seventh race being the Mexican nation, a warlike and polite people, who adoring their god *Vitsilpuztli*, he commanded them to leave their own country, promising them they should rule over other races in a plentiful country, and much wealth."[17]

It is worthy of remark that the cave dwellings or cliff houses are in the San Juan district, the most of them being on the Mancos river, and on the western portion of the San Juan. These traditions may in fact refer to these cave dwellings as the original homes of their ancestors, and at the same time without precluding the supposition that they also constructed and inhabited some of the pueblo structures now in ruins in other parts of the same area. All the early accounts concur in representing the Aztecs or Mexicans, when they first arrived in Mexico, as subsisting by the cultivation of maize and plants, as constructing houses of stone, and with a religious system which recognized personal gods. These statements are probably true. They had attained to the status of village Indians. This again renders New Mexico their probable original home as the only area in the north where ruins of structures of tribes so far advanced have been found.

[16] Birds of the Northwest, 1874, p. 534. [17] History of America, 115, p. 188–190.

The San Juan district is remarkably situated in its geographical relations. This river, rising in the crests of the high mountains forming the watershed or divide between the Atlantic and Pacific, flows southward until it enters the tableland formation through which it flows in a southwesterly and then northeasterly direction, making a long, sweeping curve in New Mexico and Arizona, after which it runs westerly to its confluence with the Colorado. It receives from the north the following tributaries, rising like itself in the high mountains, the Piedra, Pine river (Los Pinos), the Animas, the La Plata, the Mancos, the Mc Elmo, now dry, and the Hovenweep and Montezuma creeks, now nearly dry. Its southern tributaries are the Navajo, Chaco, and De Chelly. West of the Mancos river, in the region of the Ute mountain, is the so-called Montezuma valley, a broad and level plain, ten or more miles wide in its widest expanse. It has no flowing stream through it at present, and there is no certainty that it ever had. The Montezuma valley, so named by General Heffenan, of Animas city, is about fifty miles long from its north end to the San Juan river on the south, and is sprinkled over with ruins of pueblos, some of stone and others of cobble stone and adobe mortar. The Round Towers with two and three concentric walls are found in this valley. There is one at the ranche of Mr. Henry L. Mitchell at the commencement of the Mc Elmo cañon which we examined, and a second and larger one at the great stone pueblo, about four miles below, before mentioned, which we also examined. These towers are of stone, about five inches square on the face, laid substantially in courses, and they are only found in the San Juan region. They reappear in South America, at Ollanty tambo and Pisac. In this valley, without water, except in pools and springs, and with a slight rainfall during the year, Mr. Mitchell at the time of our visit, was successfully cultivating wheat, oats, maize, and the garden vegetables. Near his house were the ruins of nine pueblo houses in a cluster. These were made of cobble stones and adobe mortar, and a mile below them were the ruins of another cluster of about the same number. About four miles toward the Ute mountain, are the ruins of the great stone pueblo, with the triple round tower before mentioned. The plain stretches southward thirty-six miles to the San Juan, and Mr. Mitchell assured us that similar ruins existed in a number of places throughout its entire extent.

With such evidences of ancient occupation, here and elsewhere in the San Juan county, we are led to the conclusion that the Village Indians increased and multiplied in this area, and that at some early period there was here a remarkable display of this form of Indian life, and of house architecture in the nature of fortresses, which must have made itself felt in distant parts of the continent. On the hypothesis that the valley of the Columbia was the seed land of the Ganowanian family, where they depended chiefly upon a fish subsistence, we have in the San Juan county, a second centre and initial point of migrations founded upon farinaceous subsistence. That the struggle of the village Indians to resist the ever continuous streams of migration flowing southward along the mountain chains, has been a hard one through many centuries of time, is proved by the many ruins of abandoned or conquered pueblos which still mark their settlements in so many places. At the present moment there is not a village Indian in the San Juan district. It is entirely deserted of this class of inhabitants.

That the original ancestors of the principal historic tribes of Mexico once inhabited the San Juan country is extremely probable. That the ancestors of the principal tribes of Yucatan and Central America owe their remote origin to the same region is equally probable. And that the Mound Builders came originally from the same country, is, with our present knowledge, at least a reasonable conclusion.

Indian migrations have occurred under the influence almost exclusively, of physical causes, operating in an uniform manner. These migrations, involving the entire period of the existence here of the inhabitants of both American continents, will be found to have a common and connected history. A study of all the facts may yet lead to an elucidation and explanation of these migrations with some degree of certainty. The hypothesis that the valley of the Columbia River was the seed land of the Ganowanian family holds the best chance of solving the great problem of the origin and distribution of the Indian tribes.

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